Sydney J. Wright

MARCH, 1908.

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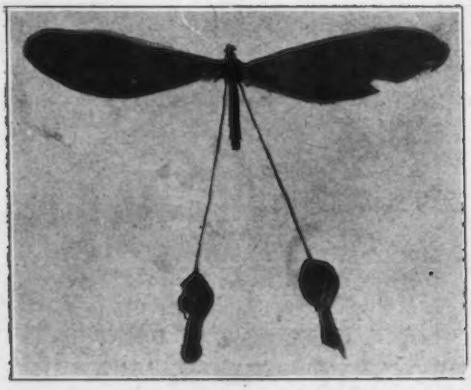

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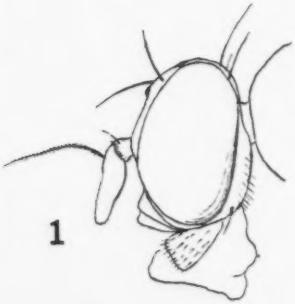

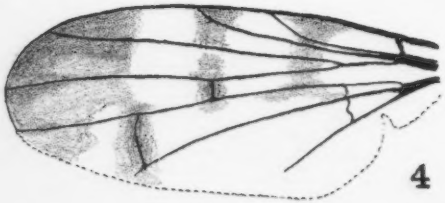

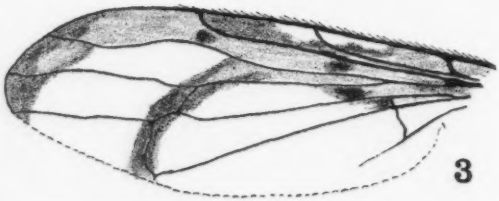

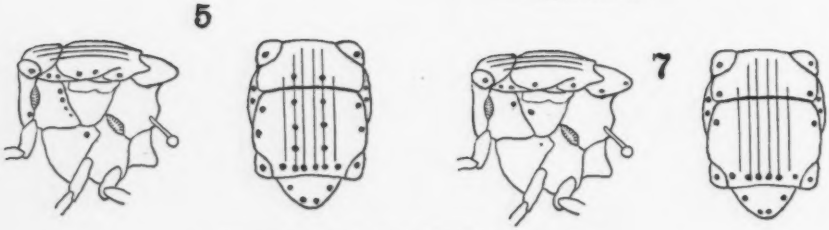

ORTALIDAE AND TRYPETIDAE (CRESSON).

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XIX. MARCH, 1908. No. 3.

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Two New Species belonging to the Dipterous Families Ortalidae and Trypetidae from Dutch Guiana, with Notes on others of these Groups.

BY E. T. CRESSON, JR.

(Plate VI.)

This material, in the collection of the Academy of Natural Sciences, Philadelphia, was collected by Miss K. Mayo in Dutch Guiana in the year 1905, except those from Idaho by Dr. H. Skinner in 1905. The South American species of these groups have been but little studied, and for that reason I have been fuller in my descriptions.

ZEUGMA gen. nov.

Head broader than high; occiput flat; eyes large; front narrow; orbits parallel. ocelli removed from vertex and widely separated; the anterior ocellus about equidistant from vertex and antennæ; vertex with stout outer- and inner-vertical bristles. Antennæ, situated below middle line of eyes, longer than the face, with third joint elongate; arista minutely pubes-

cent. Face concaved; foveæ and carina indistinct. Proboscis short, thick.

Thorax with the following bristles: 2 pairs post-dorso-centrals, two post-alar, one supra-alar, two noto-pleurals, one humeral, no sternopleural, a fine hair in place of the propleural. Mesonotum flattened posteriorly; metanotum slightly oblique and convex. Scutellum flat, with four bristles.

Abdomen ♀ ovate; first segment somewhat slender at base. Legs stout, but only middle femora thickened basally; all femora, especially the posterior pair, with a series of short spines beneath towards apex; middle tibiæ alone spurred at apex. Wings with first vein bare, and approximated to the auxiliary; small cross vein is before the middle of discal cell; third and fourth veins parallel; anal cell obtuse.

This ortalid genus evidently belongs in the subfamily Richardiinæ somewhere near the genus *Hemixantha* Lw., from which it differs mainly in the basal position of the small cross vein. The type is the following species.

Zeugma palposa sp. nov. (Plate VI, Fig. 1.)

♀ Rufous, with bluish-black abdomen. Lateral vertical angles of front, and the ocellar region, shining, otherwise front is opaque; one pair of fronto-orbital bristles which are above the level of anterior ocellus. Frontal orbits towards antennæ, orbits of face, cheeks, lower part of occiput, and an oblique line across occiput from lower part of posterior orbits to neck, silvery. Face more yellowish than front, with a brownish spot on each side near the oral margin; clypeus yellowish. Antennæ yellowish-brown; third joint darker at apex, about five or six times as long as the second, widest at base and tapering slightly to a rounded apex. Palpi distinctly flabellate, yellow at base, whitish at its very broad tip, with a brown transverse median band, entirely silvery in certain reflections. Lateral turgid portion of the occiput black. Mesonotum subopaque, blackish in the middle of the anterior margin, with a median and lateral whitish pollinose stripe. Pleura polished, black, yellow pollinose near the coxæ; metanotum shining, rufous; halteres yellow. Abdomen shining, with short appressed hairs; ovipositor polished, the first joint not as wide, but nearly as long, as the two last abdominal segments. Legs yellow, with brownish femora bearing black spines; the hind femora are somewhat constricted or indented near the bases on the inside. Wings hyaline, without spots. Length 7 mm.

One specimen. Paramaribo, Dutch Guiana (K. Mayo).

ERRATA.

Page 96, line 8, for ♀ read (♀).

" 97, " 16, after pronounced, insert tubercle, so as to read pronounced tubercle.

" 97, " 22, should read, This species differs from a typical *Xanthacrona*, etc.

" 99, " 19, for (*acrotoxa*) read (*Acrotoxa*).

Xanthacrona tuberosa n. sp. (Plate VI, Figs. 2, 3.)

♀ Yellowish-rufous; the ocellar tubercle, a spot on the mesonotum near the lateral roots of the scutellum, a narrow, short longitudinal stripe above the roots of wings, three spots on the scutellum, the narrow posterior margins of the abdominal segments and all bristles, black. Front opaque, bristles to the base of antennæ. Face more whitish yellow, opaque. Antennæ nearly as long as face; third joint broad and about six times as long as second, one-half its length in width, slightly concaved on the upper margin, apex rounded; arista brown. Cheeks about one-sixth of eye-height in width. Occiput shining. Thorax shining; two pairs of dorso-centrals, one sternopleural, but no propleural bristles. Scutellum polished, with four bristles, very much swollen, especially above, in form of two black, wart-like tubercles which project somewhat anteriorly over the mesonotum; each of these tubercles has a narrow black stripe running latero-posteriorly underneath to the metanotum; a third, but less pronounced, forms the median apex of the scutellum, also black. Halteres yellow. Abdomen shorter than the wings; first joint of ovipositor as wide as, but not longer than, the last two abdominal segments. Legs entirely yellow. Wings simliar to *X. bipustula* v. d. W.; first vein bare. Length 4.5 mm.

One specimen. Paramaribo, Dutch Guiana (K. Mayo).

This species differs from the typical description in the following points: front bristles on the sides to base of antennæ; antennæ nearly as long as face; scutellum with four bristles. In other respects it seemingly agrees. The remarkable tuberculated scutellum is merely a more developed form of the two black pustules characterized in the specific description of *pustula* v. d. W. (Biologia, Dipt. II, pp. 329). The wing-design can be readily seen from the figure given; the darker portion being grayish or black, while the remaining shaded portion is yellow. In general design this wing agrees with van der Wulp's species; therefore taking all together this species is no doubt a *Xanthacrona.*

It is well to mention here, that this genus is closely allied to *Myennis* R. D., differing, as van der Wulp mentions, but not as to the number of its scutellar bristles. There are still more important variations, as for instance: the position of the small cross vein in relation to the discal cell, and the long drawn out lobe of the anal cell of the genus *Myennis* R. D.

Melieria obscuricornis Lw. (Plate VI, Figs. 4, 5.)

Ceroxys Loew, Mon. N. A. Dipt., III, 126, 1873.
Melieria Coquillett, Journ. N. Y. Ent. Soc., VIII, 22, 1900.

Seventeen ♂, six ♀, Springfield, Idaho (Skinner).

Two ♂ and five ♀ of this series agree well with the typical description of this species, excepting that the antennæ are not brownish-black, but entirely rufous, infuscate sometimes at apex. The remaining sixteen approach *ochricornis* Lw. in having the costal spot above and that on the small cross vein more or less confluent, and the somewhat distinct marginal bands on the abdominal segments. On the other hand, the first, or basal wing-spot extends to the costa, showing a tendency towards *similis* Lw.; but this latter species seems very distinct in having the marginal bands of abdominal segments very wide and distinct.

The following is a typical description of these specimens, which I think well to give:

Front translucent yellow, orbits, vertex, face, cheeks, and occiput, whitish-yellow pollinose; one or two pairs fronto-orbital bristles near vertex. Antennæ rufous; third joint sometimes infuscate at apex; arista blackish. Foveæ brown in the middle. Palpi yellow. Thorax and scutellum whitish-yellow pollinose, with black bristles. Halteres white. Abdomen widest at second segment, gradually tapering to the apex, more grayish; posterior margins of segments 2-4 sometimes narrowly brownish; fifth segment of ♀ widened somewhat for the broad ovipositor, which is like colored, its first joint as long as the fourth and fifth segments together, gradually tapering to a truncate apex. All coxæ yellow, whitish pollinose; femora and tibiæ rufous; tarsi more or less infuscate. Wings yellowish hyaline; veins yellow except at the spot; the design as figured in Loew's Monographs, Vol. III, plate VIII, figure 20; but the first spot sometimes extends from the costa to the fifth vein; the second pair sometimes nearly confluent; and the apical cloud more or less confluent with the spot on the posterior cross vein.

Anastrepa serpentina Wied. (Plate VI, Figs. 6, 7.)

Dacus Wiedmann, Auss. Zweif. II, 521, 1830.
Acrotoxa Loew, Mon. N. A. Dept., III, 227, 1873.

Two ♂ and two ♀ Paramaribo, Dutch Guiana (K. Mayo).

No doubt these are this species, but I will give here a short description of them as follows:

Head rufous to yellow; ocellar tubercle, a spot each side, two spots on the occiput above the neck, brown or black; two pairs of lower frontal bristles; antennæ nearly as long as face, third joint about four times as long as second. Thorax blackish-brown, rufous below, marked with light yellow as follows: mesonotum with a median stripe, which is broad behind and attenuated anteriorly, sometimes this stripe is margined with deeper yellow; a stripe each side of this, behind the suture and turning sharply inwards at the suture; humeri and stripes to base of each wing; a large spot behind the wings connected with the middle by another stripe; a short stripe along the upper margin of the sternopleura. Metanotum polished, black. Scutellum, except base, whitish, with four bristles. Halteres yellow. Abdomen black or brown, but base of first and second and a median stripe on the third and fourth, which broadens to nearly the entire width of fifth and sixth segments, yellow. Ovipositor rufous, not flattened, tapering, as long as abdomen. Legs rufous to yellow. Wings as figured, the lightly shaded portions being yellow and the darker portions dark brown.

Anastrepa pseudoparallela Loew?

Trypeta (*acrotoxa*) Loew Mon. N. A. Dipt., III, 230, 1873.

One ♀ Paramaribo, Dutch Guiana (Mayo) which is crushed too much for certain identification. It may be *fraterculus* Wied., but only the male has been described, and as this specimen agrees more with this species in regard to the length of the ovipositor, I have so determined it.

EXPLANATION OF PLATE VI.

Fig. 1. *Zeugma palposa,* lateral view of head.
Fig. 2. *Xanthacrona tuberosa,* lateral aspect of scutellum and thoracic dorsum.
Fig. 3. *Xanthacrona tuberosa,* wing.
Fig. 4. *Melieria obscuricornis,* wing.
Fig. 5. *Melieria obscuricornis,* thoracic chætotaxy.
Fig. 6. *Anastrepa serpentina,* wing.
Fig. 7. *Anastrepa serpentina,* thoracic chætotaxy.

New Species of Lithocolletis.

By Annette F. Braun.

Lithocolletis trinotella sp. nov.

Palpi, face, tuft and antennæ glistening snow-white; antennæ faintly annulate above with ocherous. Thorax and basal two-thirds of the forewings glistening white, below the fold somewhat suffused with yel-

low; apical third of the wings pale golden. A pale golden basal streak begins on the costa, extends nearly parallel to the costa for one-fourth the wing length, then is bent downward and passes parallel to the fold into the golden apical portion of the wing. In the apical portion, there are two costal white wedge-shaped streaks and a similar dorsal one just before the tornus, opposite the first costal streak; all are internally margined with pale fuscous. A black apical spot. A pale fuscous marginal line in the cilia. Cilia whitish, faintly tinged with yellow. Alar expanse 5mm. Hindwings and cilia whitish. Abdomen pale grayish, ocherous above, whitish beneath. Legs whitish.

The unique type, a male, was taken in Essex County Park, N. J., by Mr. W. D. Kearfott, April 27.

Lithocolletis kearfottella sp. nov.

Antennæ grayish, darker toward the tips. Palpi shining white, with a slight golden tinge. Face shining white, with a slight golden tinge; tuft reddish saffron, scales darker toward the tips. Thorax and forewings shining reddish saffron. A white band extends across the anterior margin of the thorax, passes over the patagia and is continuous with a basal white streak. The basal streak extends for one-third the wing length, nearly parallel to the costa and is dark margined above. Four costal and three dorsal shining white streaks, all dark margined internally. The first costal streak, at the basal third, is placed very obliquely, and is produced along the costa to the basal fourth. The first dorsal streak, at the basal fourth, is very large and very oblique. Near the costa its apex sometimes unites with that of the first costal streak, forming a very acute angle. The remaining three costal streaks are placed at equal distances from each other and from the first costal streak. The second costal streak is almost perpendicular to the costa and wedge-shaped. Opposite to it on the dorsum, before the tornus, is the larger almost perpendicularly placed wedge-shaped second dorsal streak. The third costal streak is inwardly oblique, curved, its apex pointing toward the apex of the third dorsal streak which is small, wedge-shaped and placed beyond the tornus. The fourth costal streak is very oblique and curved. A large black apical dot. A brown line in the cilia extending from the fourth costal streak around the apex to the third dorsal streak. Cilia grayish. Just below the fourth costal streak, there is a darker brownish streak in the cilia, giving the appearance of a hook, as in *L. fitchella* Clem., but not as distinct. Alar expanse 7 mm. Hindwings pale grayish with a slight ocherous tinge. Cilia whitish gray, tinged with ocherous. Abdomen dark gray above, silvery white beneath. Anal tuft grayish, ocherous. Legs silvery white slightly shaded with ocherous, tibiæ and tarsi of the first pair very dark brown.

Three specimens, Montclair, N. J., bred by Mr. W. D. Kearfott, from mines on chestnut collected in October, 1901. The imagols appeared in the following spring.

Lithocolletis malimalifoliella sp. nov.

Antennæ gray. Palpi silvery white. Face silvery white. Tuft golden brown, tipped with dark brown. Thorax and forewings golden brown. There are three longitudinal stripes on the thorax, one median, the other two passing over the patagia and continuous with a median white basal streak, ending at one-third the wing length and dark margined above and around the tip behind. The dorsal margin is also white for a short distance. There are three costal and two dorsal white streaks of which the dorsal are the larger, all dark margined before, and the first pair dark margined at the tip behind. The first costal, at the basal third is small, oblique. The first dorsal, at the basal fourth, is very large, oblique and curved, ending just before the apex of the first costal. The second costal streak is small, nearly perpendicular, and opposite the second dorsal, which is triangular, and placed just before the tornus. The third costal streak, at the same distance from the second as the latter is from the first, is somewhat oblique, pointing forward. A third dorsal streak is indicated by the dark margin. An elongate black apical spot, with a few scattered brown scales before it. Marginal line in the cilia blackish with a distinct blue luster around the apex. Cilia gray, brownish around the apex. Alar expanse 5.5-6 mm. Hindwings dark gray. Cilia gray. Abdomen very dark gray above; silvery white beneath. Legs gray, hind tarsi blackish, grayish at their bases.

I have bred this species from small tentiform mines on the underside of apple, *Malus malus* (L). Britton. The appearance of the mine is entirely different from that of *L. blancardella* Fab. The mine is much wrinkled, and the leaf is strongly folded. The parenchyma is eaten in spots, giving the leaf a speckled appearance on the upper side. The pupa is suspended in a few silken threads. I also have flown specimens from Montclair, N. J., which are identical with the bred specimens.

Lithocolletis salicivorella sp. nov.

Antennæ pale grayish ocherous, faintly annulate with darker, somewhat darker at the tip. Palpi shining white. Face white. Tuft pale gray with an ocherous tinge. Thorax and basal third of the forewings ocherous gray. Wings becoming more ocherous towards the apex. A white band across the anterior margin of the thorax extends across the patagia and is continuous with a median basal white streak on the forewings.

There is a short dorso-basal white streak, somewhat dilated posteriorly. The median basal streak is curved downwards, and extends for two-fifths of the wing length, where it is confluent with the first dorsal streak, its upper edge uniting with the apex of the first dorsal streak. A few dark brown scales extend around the apex of the angle thus formed. There are four costal and three dorsal white streaks. The first dorsal streak at the basal fourth is very large, oblique and curved. Internally, it is dark margined just before it unites with the basal streak, the dark margin being continued around the angle and for a short distance along the lower side of the basal streak. The extreme edge of the costa is dark brown for about one-third of the wing length, where the dark line is deflexed, and continues as the dark margin of the first costal streak which is narrow, very oblique, its apex extending to a point just beyond the apex of the first dorsal. The second costal streak is large, nearly perpendicular, its apex opposite to that of the second dorsal streak, which is also very large, and placed slightly nearer the base than the corresponding costal streak, and is somewhat oblique. The next pair of streaks, of which the dorsal is placed just above the tornus, are nearly opposite to each other, slightly oblique toward the base and curved; their apices nearly meet. These two pairs of streaks are margined internally with brown scales. Fourth costal streak oblique, cuved and unmargined. A narrow line of black scales extends from below the apex of the last costal streak to near the apex of the wing, and is margined above by a line of white scales. Marginal line in the cilia dark brown, extending around the apex from the fourth costal streak to the third dorsal. Cilia grayish ocherous. Alar expanse 7 mm. Hindwings grayish. Cilia gray, with a fulvous tinge. Abdomen dark gray above, whitish beneath. Anal tuft grayish ocherous. Legs whitish, banded and striped with gray.

The unique type, a male of this species, was bred by Mr. W. D. Kearfott from a much wrinkled mine on the underside of a willow leaf, collected in Essex County Park, N. J., July 6, 1902. The imago appeared July 19.

This species is nearest to *L. scudderella* Frey & Boll, which it closely resembles in the costal and apical markings.

Lithocolletis tremuloidiella sp. nov.

Antennæ dark gray, the joints becoming lighter toward their bases. Palpi grayish white. Face grayish white. Tuft gray, mixed with white. Thorax pale reddish brown near the base, becoming more ocherous beyond the middle. There is a short median basal white streak, and a dorso-basal white streak, both thickly dusted with blackish scales, and uniting with the first dorsal streak. There are five costal and five dorsal

white streaks, all dark margined internally and more or less dusted with blackish scales, the last two pair, however, not dusted. These streaks are situated as follows: a large oblique white costal streak at the basal fifth, attaining the middle of the wing and prolonged backward; nearer the base an oblique dorsal streak, almost meeting the first costal before the middle; the second costal streak also oblique; the second dorsal streak nearer the base than the second costal, large, oblique, strongly constricted just below the fold, and uniting with the apices of the first and second costal streaks; third costal and third dorsal streaks nearly opposite, less oblique, their apices separated by a narrow prolongation of the blackish internal margin. The fourth costal and dorsal streaks, of which the costal is at the apical fourth, the dorsal at the tornus, form an inwardly convex white fascia. Fifth costal and dorsal streaks also form a curved white fascia. An irregular blackish apical spot. Marginal line in the cilia blackish with a bluish luster. Cilia gray. Alar expanse 9-10.5 mm. Hindwings gray. Cilia gray with a reddish tinge. Abdomen dark gray above, grayish white beneath. Anal tuft grayish ocherous. Legs dark gray, tips of the tarsi lighter.

Described from specimens bred by Mr. W. D. Kearfott from tentiform mines on the underside of leaves of *Populus tremuloides* Michx., received from Mr. J. W. Cockle, Kaslo, B. C., Aug. 26, 1907. The imagos appeared during the same month. The mine is large (for an underside *Lithocolletis* mine), oval, and with a fine fold through its long axis. It closely resembles the mine of *L. salicifoliell*a on poplar, but is very much larger.

There is considerable variation in the extent of the white markings; sometimes the fascia formed by the fourth pair of streaks is interrupted, and the fascia just before the apex does not reach the inner margin.

This species is very close to *L. salicifoliella* in the character and arrangement of markings; but may be distinguished from it by the much greater expanse, the slightly shining and more reddish ground color of the forewings, the slightly less oblique position of the white streaks, and by the noticeable bluish luster of the marginal line in the cilia. The specimens which appear in August are densely dusted, in this respect differing from the corresponding brood of *L. salicifoliella.*

Possibly this may be the species from Colorado, which Chambers doubtfully identifies as *L. salicifoliella.* (Cin. Quart. Jn. Sci., II, 302, 1875)

By some mistake this species has been referred to as *Lithocolletis populiella* Chambers by Mr. Busck in his paper "Tineid Moths from British Columbia" (Proc. U. S. Nat. Mus., XXVII, 770, 1904) and by Dr. Harrison G. Dyar in "Lepidoptera of the Kootenai District" (Proc. U. S. Nat. Mus., XXVII, 937, 1904).

Lithocolletis saccharella sp. nov.

Antennæ pale ocherous, beyond the basal third annulate with dark; several joints toward the tip dark. Palpi shining white. Face shining white. Tuft whitish, golden toward the sides. Thorax and forewings ocherous. A white stripe on each side of the middle of the thorax is continuous with a very oblique curved white streak at the inner angle of the forewing. This streak, which is sometimes dark margined behind, extends to the fold and is usually prolonged along the fold to unite with the first dorsal streak. The first dorsal streak begins at the basal fifth, is oblique and curved, and extends slightly more than half way across the wing. The second dorsal streak, at about the middle of the dorsal margin, is also oblique and curved, and near the costa, its apex meets that of the first costal streak, which is short, oblique and placed slightly beyond the middle; thus forming an acutely angled, interrupted fascia. The second costal streak, at the apical fourth, is sometimes almost overlaid with black scales. Above the dorsal cilia is a long oblique white streak. All the streaks are dark margined externally. Apical portion white dusted with black. There is considerable variation in the extent of the black dusting, which sometimes extends to the tornus. Marginal line in the cilia brownish ocherous. Cilia pale ocherous. Alar expanse 5-7 mm. Hindwings pale grayish ocherous. Cilia pale ocherous. Abdomen gray above, pale ocherous below. Anal tuft ocherous. Legs whitish. Hind tarsi faintly tipped with black.

Described from specimens bred at Cincinnati, Ohio. I also have specimens taken in Essex Co. Park, N. J., by Mr. W. D. Kearfott.

The mines of this species are very common on Sugar Maples, *Acer saccharum,* Marsh. and *Acer nigrum* Michx., as many as 25 or 30 mines sometimes occurring on one leaf. The mine is a small irregular blotch on the upper side. The pupa is not enclosed in a cocoon. The imagos appear from May to June and again in August.

Mr. Chambers (Can. Ent. III, 130, 1871) confused this species with *L. aceriella* Clem., which it in no way resembles.

Lithocolletis agrifoliella sp. nov.

Antennæ pale ocherous, spotted with brown above, the last five spots more widely separated. Palpi yellowish white, dark brown externally. Face yellowish white. Tuft yellowish in the middle, brown at the sides. Thorax reddish ocherous, with a few dark scales on the patagia. Forewings reddish ocherous, somewhat shining. At the basal fourth is a perpendicular white dorsal streak dark margined externally and reaching to the fold. A little farther back is a nearly perpendicularly placed white costal streak, convex outwardly beneath the costa and also attaining the fold, slightly beyond the dorsal streak; it is strongly dark margined externally; its short internal straight dark margin is opposite the external dark margin of the first dorsal streak. Near the base, the costal portion of the wing is of a smoky hue. Placed diagonally across the wing toward the base on a line with the internal edging of the first costal streak are two black transverse spots, the first just above the fold, and the second nearer the base just below the fold; sometimes with a few whitish scales internally. At about the middle of the wing length is a broad oblique costal streak, internally dark margined near the costa, and its external dark dusting continued as the external dusting of a much narrower dorsal streak, whose apex just meets that of the costal. At the angle, the dusting is very dense on a white ground, and is continued backward as a broad band, nearly one-half the breadth of the wing, to a point between the third costal and dorsal streaks The third costal streak, which is sometimes a spot, not touching the costa, is inwardly oblique and externally dark margined. Opposite it is a long oblique dorsal streak, whose external dark margin is continued into the dusted apex, and which usually unites with a sickle-shaped costal streak, lying above the dusted apex, and concave toward the costa. The dark margin of the third costal streak is sometimes continued along the costa to this last streak. Cilia ocherous, with a dark brown hinder marginal line through their middle. Alar expanse 7.5-9 mm. Hindwings gray, with a bluish metallic luster. Cilia fulvous. Abdomen dark bluish metallic above in the male, pale yellowish beneath, with a median line and diagonal marks on each segment dark. In the female with the last two or three segments and tuft ocherous, pale ocherous beneath, and marked as in the male. Legs whitish, the first two pair annulate with black; hind tibiæ shaded with ocherous and black scales, tarsi tipped with black.

Mills College, Alameda County, California.

Described from specimens bred from leaves of *Quercus agrifolia* Nee. received from Mr. G. R. Pilate. The mine is a whitish, somewhat irregular blotch on the upper side of the leaf. The pupa is formed under a flat nearly circular semi-

transparent web, the upper epidermis, as is usual, being thrown into a longitudinal fold.

This species is very near to *umbellulariae* Wlsm. The most marked difference is the absence of the costal and dorsal basal white patches characteristic of that species.

Lithocolletis platanoidiella sp. nov.

Antennæ whitish, banded with brown above. Palpi shining white. Face shining white, with a slight golden lustre. Tuft golden. Thorax and forewings deep shining ocherous. Extreme edge of the costa toward the base black. The first costal streak at the basal fourth, short, oblique and outwardly dark margined. The second costal streak, at the middle of the wing length, is also oblique, and its apex meets that of the longer corresponding dorsal streak, which begins at the middle of the dorsal margin, somewhat nearer the base than the costal streak. There is thus formed an interrupted, angulated white fascia, of which the external dark dusting is continuous, and is prolonged backward to the space between the third costal and the second dorsal streaks. These latter streaks are placed opposite to each other, the costal at the apical third, the dorsal at the tornus, and both are dark margined behind. Fourth costal streak somewhat oblique, pointing forward, and dark margined behind by a few black scales. Apical portion white, dusted with black scales. This dusted portion forms an almost rectangular area. At the base of the costal cilia, but not extending through them, and anterior to the dusted apex, is a small white streak. Marginal line in the cilia brown. Cilia ocherous around the apex, becoming gray toward the tornus. Alar expanse 6.5-8 mm. Hindwings gray. Cilia gray, tinged with reddish. Abdomen gray above, shining silvery ocherous beneath. Anal tuft ocherous. Legs. Front legs dark brown above, with a narrow white stripe beneath. Tarsi white at their bases. Middle and hind legs whitish ocherous, their tarsi tipped with black.

I have bred this species at Cincinnati, O., from blotch mines on the upper surface of leaves of several species of oak, viz. *Quercus alba* L., *Quercus macrocarpa* Michx., *Quercus platanoides* (Lam.). The larva is of the flat type, and when mature, spins an oval flat silken cocoon. The imagos appear in August. The larvæ of the fall brood hibernate in silken-lined chambers.

This species superficially resembles *L. bethunella* Cham., from which it can be distinguished by the absence of the dorsal streak at the basal fourth and by the presence of two costal streaks beyond the fascia, there being but one such streak in *L. bethunella.*

Lithocolletis arcuella sp. nov.

Antennæ whitish, annulate with brown above, tips blackish. Palpi silvery white. Face silvery white, slightly tinged with golden. Tuft yellow, mixed with orange at the sides. Thorax and forewings shining reddish orange, with glistening white markings. There are three costal and three dorsal white spots, the second pair uniting to form a fascia; all black-margined externally. The first costal spot at the basal third is short and broad, its dark margin, passing around its apex, almost encloses it. The first dorsal, almost square, begins nearer the base than the first costal, and extends half way across the wing. A broad white angulated fascia at about the middle, black-margined externally and on the costa internally. Third costal streak strongly arcuate and opposite the more triangular dorsal streak; the external dusting densest immediately behind their apices. Apical portion densely dusted with blackish-brown scales, and bordered internally by an indistinct outwardly concave streak of silvery scales. Marginal line in cilia brownish. Cilia golden, becoming grayish towards the tornus. Alar expanse 10 mm. Hindwings bronzy gray, cilia gray. Abdomen bronzy gray above, silvery beneath. Anal tuft reddish. Legs, except the first pair, ocherous, tarsi whitish and unspotted. First pair striped with dark gray, tarsi banded with gray.

One specimen taken at Mountain Lake, Giles Co., Va., June 20, 1907. A very large and distinctly marked species, belonging to the same group as *L. bethunella,* Cham.

Male Polistes annularis Survive the Winter.

By C. S. Brimley, Raleigh, N. C.

Finding among my pinned wasps some male *Polistes* taken in December and January, I kept notes of all the *Polistes* taken while hibernating during the winter of 1906–7, with the following results:

November 29, 1906. Fifty-four *Polistes* taken, of which twenty were male *annularis* and thirty-one females of the same species; three were females of other species.

December 4, 1906. Fifty-seven taken, of which one was a male *annularis* and the rest females of other species.

February 8, 1907. One hundred and thirteen taken, of which fifty were males and fifty-six females of *annularis* and seven females of other species.

March 22, 1907. Three males and two females of *annularis* taken on the wing. On March 26th two more male *annularis* taken, also on the wing.

Argynnis astarte, Doubl.-Hew., and other High Mountain Butterflies.

By F. H. Wolley Dod, Millarville, Alberta.

In Can. Ent., xl, p. 14, January of the present year, is an article by Dr. Henry Skinner, expressing regret that so few definitely specified localities for *Argynnis astarte* have ever been recorded. As some notes of mine on this and other Alberta species will shortly appear in those pages, I thought I would take the opportunity of dealing more fully with the habitats and habits of some of the high mountaineers of British America in the News. Were I in Dr. Skinner's position of never having "been there before," I suppose I should have felt just the same about the matter, and been quite at a loss, once arrived at one of the C. P. R. hotels in the Canadian Rockies, where, when or how to go to the most likely place to get or even to see *astarte* in the shortest possible time. Yet had I not read his article, I should probably not have troubled to name any exact locality, so confident do I feel that *astarte* could be found in a favorable season upon any peak at or above the timber-line—8000 feet is not necessary—round Banff or Laggan, or the adjacent neighborhood, a few weeks after they were sufficiently bare of the previous winter's snow.

My first acquaintance with the mountain tops was in 1900, when I made the trip from Laggan Station to the nearest mountain to the northeast, as that had been pointed out to me a few years previously by Captain H. J. Elwes, as one which he *thought* Mr. Bean had told him was a good one for butterflies. Mr. Bean's "low, smooth mountain directly north of Laggan" is very likely this, as the station hands told me he used to go and camp high up on it for weeks. His mountain "three miles southwest of Laggan, 8500 feet," is very likely Piran, or St. Piran, as it is called on some maps, of which the latest computed height is 8610 feet. Well, I got there; and just below the summit I got a portion, about half—the central half of an *astarte* ♂. If the rest of him had been anywhere near, it would probably have assisted him better to keep out of my way, and I should not have got him. On the top ridge, a long, even

shaly slope, suitable for running hundred-yard races, I saw a few more and caught a fresh though slightly crippled ♂ *Œneis beanii*. Then in went the sun for the day, and the day following brought snow. That was on August 8th. I referred to the locality in Can. Ent., xxxiii, p. 161, as Slate Mountain (I wrote southeast by mistake), as it and its neighbor to the west were marked on the map as "Slate Range," but I have failed to discover whether it has received a definite name even yet. Four days later I took another in even worse condition, on the top ridge of Sulphur Mountain just on the timber line, at about 7200 feet. Mr. Sanson's capture on June 27, 1900, I think the earliest yet recorded, and that near the Devil's Lake, Banff, was recorded by me in the pages referred to.

On July 18, 1904, after having waited round Lake Louise, Laggan, in company with Mrs. Nicholl for two days, waiting for a gleam of sunshine and breath of warm air, and sitting on snow-drifts to try and keep warm, I started alone on another visit to the "Slate Mountain" in most unpromising weather. It did no better than it promised either, and the most interesting thing I found was a pair of ptarmigan with a young brood which, by-the-way, are less afraid of a man than the average barn-door fowls. If anyone contemplates making a trip to that mountain for butterflies and back in a day, my advice is *don't!* It is nearly three miles from Lake Louise to the station, and three more through burnt and fallen timber to the foot of the mountain. There are others far easier of access and probably equally prolific or more so.

On the day following the sky had almost completely cleared, and I piloted Mrs. Nicholl up the trail to Saddle Back, about two miles from Lake Louise chalet. It was there on a grassy and heathery slope that I had taken what I never believe is *Colias streckeri* and which I recorded as *nastes*, and *C. pelidne* var. *skinneri*, and a worn specimen of *Chrysophanus snowi*. But that had been nearly three weeks later, and now the previous winter's snow had evidently not been long off the ground, and there was nothing to be seen. As I had brought Mrs. Nicholl up that height rather against her inclinations, I felt somewhat disgusted. We sat down on a fallen log (we were

at about 7000 feet, a little below the limit of timber) and thought. We were in between two peaks, Fairview 8875 feet, according to the map I had consulted, and Saddle Peak 7900 feet. Presently Mrs. Nicholl asked, "Which of these is the most likely peak for *astarte?*" I had been at Laggan before and she had not, so I felt bound to give advice. "That, I fancy," I replied pointing to the top of Fairview, some 1900 feet above us. I had no idea that she intended going up, for the wind was fresh and cold and not a butterfly or moth was to be seen moving. We appeared to be too early by a fortnight for so high an elevation. However, she wandered off in that direction and I still sat and thought.

About an hour later, *i. e.*, at about midday, I espied her close to the summit. I had now made up my mind that we were wasting time up in this windswept, belated region, and tried to signal her to return to much lower levels. I failed to catch her attention, so started off—to fetch her back. I had hardly commenced the ascent when I caught a freshly emerged ♂ *C. skinneri*, that species reaching to barely above the timber line, which at Laggan averages about 7200 feet. I had yet to go within about 500 feet of the summit when whiz! flash! What was that? A red butterfly. *Astarte?* That cannot have had the temerity to emerge from the pupa up here already this wintry season! Mrs. Nicholl will be interested to hear I have seen something reminding me of *astarte*. I hurried up to the peak. The wind had now dropped, or else I had got above it. The huge loose rocks with which the mountain top seemed to be piled up, caught and reflected the sun's heat and I seemed to have reached a different climate. I soon caught sight of Mrs. Nicholl flourishing the net. "Hello! Why didn't you come up long ago? *Astarte* swarms. I've been having grand sport for the last hour." And sure enough, there they were in *dozens!* But how they flew! Now dodging around the rocks, then whiz! Flash! Over cliff or else straight away out of sight as though one had a train to catch, and not another chance for a week. Sometimes two or three would meet and fly almost vertically upwards, gyrating around one another to a height of 50 or 100 feet, then separate and descend still

more quickly though less vertically in different directions. Occasionally one would settle on a rock, but if ever I did manage to get within striking distance I generally missed, so quickly do they dodge. It is a great exertion to climb 3000 feet from the hotel to the regions of *astarte*. It is a great sight when there to see *astarte* on the wing, common. But it is a greater feat when seen, to catch it! "Look! there goes one. He's off! There's another. Look! Two! Behind you!" Indeed, at times they seem everywhere at once, and then perhaps ten or fifteen minutes you may not see more than one, passing like a flash. Between us, I think, we got ten in a couple of hours, but then we were paying attention to *Argynnis alberta*, *Oeneis beanii* and *Chrysophanus snowi*, as well, and, the writer especially, had an eye to moths also. *Astarte* is such a brute to catch, and there are several other good things to be had round the peaks, so that exclusive attention to this species during one day's visit does not commend itself. Personally, I was always a great muff with the net, and Mrs. Nicholl more than doubled my catch. It may be that on duller days with intermittent sunshine and lower temperature, this butterfly may be easier to capture. I have had no opportunity of trying.

Oeneis beanii was still more common at the same place. It is decidedly shy of approach, but with extreme caution is not hard to stalk when at rest and does not make long flights. I think we got fifteen or twenty on that day in fine condition, and nearly all males. *Astarte* were also prime, and males exclusively.

A. alberta was just out, and though far less common than the others was much easier to catch. It is not a peak-haunter, preferring even shaly slopes a few hundred feet lower. I saw none on the extreme summit. Castle Crags, or rather the lower ridges leading to them from Fairview, I found good ground for it and an easy footing for quick movements. It is a lazy, slow flier and does not like to rise. It often settles, and from its low-flying habit I have often caught a netful of shale, either instead of or as well as the butterfly. On that day we took about a dozen, both sexes. Later in the day I found *Oeneis beanii* and *astarte* on the wing on Saddle Peak as late as 5 p. m. It should be remembered that

the favorite haunts of ♂ *astarte* and *beanii* are either cliffs or gigantic piles of sharp-edged rocks which make running a yard absolutely impossible, and quick movements with one's feet inadvisable, often highly dangerous. This, with the exertion of climbing, the uncertainty of the weather and the fleetness and shyness of *astarte* makes one feel that it is of some value when caught. *Chrysophanus snowi* was also to be had in similar situations to *alberta*. But this species goes below the timber line.

On the following day, in warmer weather, we made the ascent of Piran on the opposite side of Lake Louise. There we found the same four species in equal, if not greater numbers, with the addition of *Melitaea anicia* var. *beanii*. This form goes far above the timber line, but does not reach the summit. The typical *anicia* is found lower down and there appears to be gradations through. This, by-the-way, I had taken on Slate Mountain, as well as *Lycaena aquilo* which flies on Piran also, but above and below timber. Here also we took a few *Colias streckeri* which was just coming out. This on a lower ridge leading toward Mt. Victoria. On this ridge running is safe and easy, and *Argynnis alberta*, *Chrysophanus snowi*, *Oeneis beanii*, and occasionally *Lycaena aquilo* are to be found. Such situations are perhaps the best for catching *Oeneis beanii* by reason of the open ground, though more may be seen higher up. For *astarte*, ♂, "Excelsior" must be the motto. This afternoon Mrs. Nicholl took a ♀ down close to the timber line above the head of Lake Agnes and near the same place a ♂ of *Colias elis* just out. Here end all my personal experiences with *alberta* and *astarte*.

On July 16th and 18th of last year I had some success with *Oeneis beanii* again on Piran, the first day in dull, cold weather with a few glimpses of sunshine. If the sun appeared for a few seconds, so did *beanii*. I would mark him down, and even if the sun went in again at once I frequently caught him, sometimes in a pill box! Once I delved down about two feet amongst stones and got him. On the 18th I took two ♀ ♀, one near the summit the other within 200 feet of Lake Agnes, *i. e.*, about 6950 feet, and quite freshly emerged. I saw the species all over the south and east sides of the mountains from the timber line up.

The west side is precipitous. The season was exceptionally late and *astarte* evidently not yet out. *Neoarctia yarrowi* has more than once been taken on Piran, and today I found a half-grown larva on a rock which was probably this species, and several cast skins. The larva refused all food and died. *Melitaea beanii* and *Anthocharis creusa* were other catches, at and just above timber.

On July 7th I ascended Mount Stephen, Field, B. C., up to 7500 feet or a little higher. I took a freshly emerged *yarrowi* ♀ sitting on a rock in blazing hot sunshine. It made no attempt to escape, though its wings were dry. I caught *Œneis beanii* ♂ and saw one or two more. A full-fed larva found several hundred feet above timber produced *Lycaena aquilo* ♂ on July 29th. On the 8th I went up Mount Field by way of Burgess Pass. Here again I took *Oeneis beanii* and saw three or four more. That was on a low spur overlooking the railway, by no means the highest point. Also a full-fed larva which started to spin within four hours and produced a ♂ *yarrowi* on July 29th. He crippled very slightly in drying, not seeming to understand climbing up sticks but wanting *rocks*. The larva was at rest in the hot sun. Today I got a thirty-yard view of a goat, which stood and stared at me but did not allow himself to be caught. On the 13th I made the ascent of a mountain, probably nameless, about six or eight miles south-east of Windermere, B. C., by way of what is locally called "Taggart's Pass." It is timbered practically to the summit, and probably scarcely over 7000 feet. Result, *inter alia*, two or three *Oeneis beanii* seen quite close but not captured. *Pyrgus centaureae*, one in fine condition, several hundred feet lower. This, by-the-way, I have from Lake Agnes, Laggan, much worn, July 17, 1904. In Edward's Butterflies of North America, iii, part xv, Mr. Bean writes: "In 1890 I took one pair of *Arg. alberta* on a mountain near Hector, B. C., two miles west of Alberta Province line. On that mountain lives *Chionobas brucei*, never yet observed at Laggan, only nine miles distant."

Mrs. Nicholl records both *alberta* and *astarte* from Lake O'Hara, B. C., and the Yoho district. Nowhere there, however, did she meet with *Oeneis brucei*, though at my sugges-

tion she was even on the lookout for it. Last year, however, she met with it some way to the north of Laggan. She writes: "The first place I took it was on a mountain at the head of the North Fork of the Saskatchewan flying with *beanii*; it was common on all the high mountains north of that. It is evidently a more northern species than *beanii*, and I think harder to catch." I am indebted to her for a good series. About other species she writes: "I got eleven *astarte* on the spurs of Mount Athabasca, and northwards, very fresh, the last week in July, and *alberta* fairly swarmed in many places. . . . . I got twenty-five in one day on the slopes of Wilcox Peak. . . . Wilcox Pass, or rather the valley just south of it, is the headquarters of *C. elis*, which swarms there, with a few *christina* in company. *Elis* is evidently a northern insect. It is the commonest *Colias* on the Athabasca. One *Pyrgus centaureae* on Brelahtan Pass in August is the only one I got."

Her record for *alberta* during 1907 is particularly interesting, as during six years collecting at Laggan Mr. Bean only met with it in the even-numbered years, and suggested that it was biennial in appearance. It may be at Laggan yet, for all anyone knows, as I have no odd-year records. By-the-way, I found year-old wings of either this or *astarte* in a spider's larder under a stone on Mount Stephen. Two very high mountaineers, though perhaps scarcely worth climbing after, are *Pamphila comma* and *Pieris occidentalis*. I have *comma* (form *manitoba?*) from 8500 feet, and *occidentalis* from the actual summit, over 8600 feet of Mount Piran. I got wildly excited on viewing four or five of the latter species in the distance playing round a high ridge on Mount Field, and thought I had come across a new species.

On page 84 of the February NEWS, *Elytroleptus floridanus* is said to have been recorded in the East only once before, from Massachusetts. It might be of interest to some, to know that it has been taken *abundantly* in this vicinity, for the last five years. It is found on oak leaves, the last of May and the first of June.—NORMAN S. EASTON, Fall River, Mass.

Notes on Catocala.

R. R. ROWLEY, Louisiana, Mo.

My work with Catocala in 1907 began on the 23rd of March, when a batch of eggs of *C. unijuga* that I had received from Mr. C. Leonhard of Kearney, N. J., began hatching prematurely, prompted, no doubt, by the unusually warm weather that prevailed from the 20th to the 28th, the thermometer ranging for a week from 80 to 90 degrees. A few tender leaflings had burst their winter coverings in anticipation of an early spring, but came to grief in the protracted cold weather that followed.

It taxed me to the utmost to get food for the hungry young "crawlers" and I was compelled to keep a fire going in the "bug house" from the last of March to the 8th of May to save the brood.

The freshly hatched larvæ were very slender, span-worm-like, with large, almost black heads.

The first moult took place on March 28th, five days from hatching and the caterpillars changed to black with a cream-colored. middorsal band and an almost white ventral side with four or five large, round or square black spots along the middle.

On the 5th and 6th of April the larvæ moulted the second time, reaching a length of three-fourths of an inch with sides dark, mottled with a lighter color. The middorsal line, light, narrow and with a rather large spot of the same color on the segment beyond the third pair of true legs and another above the second pair of prolegs. The venter, cream color. A dorsal hump over the third pair of prolegs.

On the 10th of April the third moult occurred, with the larva nearly an inch long, brownish and grayish in irregular streaks. The dorsal cream colored line reduced to small separated sausage-link-like spots, not very distinct.

The fourth moult occurred on the 16th of April, the larva being a light gray with dorsal hump and dark spot over interspace between the 3rd and 4th pairs of prolegs, with a white

lateral patch on either side, just in front of the black dorsal spot. A broad, white cross band just back of the 3rd pair of true legs. Head light gray with a black marginal line down each side and above. The third pair of prolegs as large and prominent as the end props. A row of small, middorsal, rounded, connected white spots with black boundaries. As the larva lies flat on the stem, it furnishes a strong case of protective mimicry.

From April 22nd to 24th the fifth moult occurred. Just after this moult, the larvæ vary in length from one and a half to quite two inches, possessing small, light-colored tubercles, each set with a bristle and the entire body with a lateral fringe of short setæ.

Head much larger; the body a little darker than before but without any black spots. Head with encircling band of black. Both true and false legs light. Whole body with light and dark gray longitudinal, irregular stripes or figures.

In the full grown larva the upper lobes of the head inside the black encircling band, yellowish brown. The ground color becomes ashen gray with pale, longitudinal lines, much broken and irregular. The hump over the 1st pair of prolegs quite disappears and the enveloping spot is hardly noticeable. Larva quite two and a half inches long. Between the fifth moult and maturity fifteen of the fifty larvæ died.

The first case or cocoon was spun May the 9th, on the ground between two leaves. Others spun between folds of paper in the breeding jars. The first chrysalids on May 14th or 15th, about an inch and a quarter long, dark brown on dorsal side, red brown on ventral, abdominal rings, a whitish prunescence covering the whole pupa. The first two imagos on June 13th, the length of pupal stage being 33 days. The last imago on June 20th.

Eggs of *Catocala cara* began hatching on the 29th of May. As in *C. unijuga*, the larvæ are very small and slender and exceedingly active. So much so indeed, that nothing short of an air-tight box will prevent their escape. The freshly hatched larva is light brown with somewhat darker head and rear. About one-fifth of an inch long, rapid in movement and

much like young span worms. Diameter hardly more than a No. 40 sewing thread.

Larvæ hatched on May 31st, moulted the first time on June 6th. Before second moult the larva becomes very dark, the latter half being practically black, the dorsum of the front half being light brown. On the top side of the body, back of the prolegs, is a yellow, longitudinal stripe. True feet and prolegs black. Head small, not black.

After second moult (June 10th) the larva is nearly half an inch long; a dark, almost black band along the side with a broad middorsal and upper lateral yellow-brown or orange stripe interrupted only at the hump, over the 3rd and 4th prolegs, by a cross black patch. Pro- and true legs straw color. Head dark.

Just after third moult (June 13th) the larva is about three-quarters of an inch long, very light yellowish-brown with very fine, longitudinal lighter lines and deeper yellow-brown at segment edges. The cross band over third pair of prolegs is red-brown and marks the dorsal hump. True and prolegs light brown. Head with black lateral dash to each side.

Just after fourth moult (June 17th) the larva is light yellowish gray with orange tubercles and short bristles. Lateral fringe of setæ. Humped over 2nd pair of prolegs and with larger twin tubercles over the next to the end segment, forming a hump-like ridge. Head light with lateral black stripe and yellow lateral prominence. True and prolegs flesh color. Length one and one-eighth inches.

When fully grown, about two weeks after fifth moult, the larva is over three inches long and marked much as above stated. In the breeding jars the larva usually spins among the willow leaves on the stems, not on the bottom of the jar as do most *Catocala* larvæ. The pupa is large and covered with a whitish prunescence.

During the past two summers, I have kept a close watch for larvæ of *C. cara* on a small willow tree in my back yard and have been rewarded by finding a number of fine caterpillars. Small "worms" were sometimes taken on the underside of dead

twigs while two half grown specimens were found on the bark at the base of the tree in the shadow of some drooping raspberry leaves. On the underside of a dead branch of somewhat greater diameter than a lead pencil, two well grown larvæ were found.

After the tree had apparently been robbed of all its caterpillars and several days had passed without finding any, in the folds of a muslin bag tied on a living branch, three mature larvæ were discovered.

A trick was then tried that had proved successful in the search for *Catocala piatrix* larvæ. Sticks or dead branches were leaned against the tree and, in the morning, several larvæ were found on the under side of the sticks.

I am sure that when no shelter is to be found on the tree, the larvæ, after the night's feeding, leave the tree and hide beneath leaves or find other retreats.

I found this so in *C. piatrix* by scattering pasteboard and folds of paper beneath walnut bushes and in the morning securing the larvæ beneath the boards or in the folds of the paper.

Small larvæ of all species of Catocalæ, perhaps, are sometimes found in the bark grooves or cracks and, perhaps, always with the head down and in most cases within three or four feet of the ground. We have never climbed for any but hickory species and then only when the rough loose bark extended beyond reach.

I recall a walnut bush that grew near the edge of a low bank and the water had worn a hole down among the roots. I thrust my hand down the hole and felt among the rootlets till I found a fine large *C. piatrix* larva.

On the underside of a willow that had fallen over, a very large *cara* "worm" was discovered near the ground.

Beneath the loose bark of shag-bark hickory, larvæ of a number of species of *Catocala* can be easily found and usually near the ground, but sometimes higher if the loose bark extends upward.

On hickory we have taken larvæ of *C. residua, C. habilis,*

C. epione and Mr. E. A. Dodge adds, *palaeogama, vidua, retecta* and *robinsoni.*

It is certain that *viduata, lachrymosa, judith* and other black-winged species feed on hickory and perhaps pecan.

We have found the larvæ of *neogama* on walnut and suspect *nebulosa* has the same food plant.

Our commonest species, *innubens,* feeds on honey locust as does also *illecta.* The latter species was common here in 1900.

Amica and *illia* feed on oak.

The late summer of 1907 proved a good *Catocala* season here and some rarities were taken. *Illecta* was noticeably absent.

On the 9th of August I took an imago each of *Catocala subnata* and *dejecta* and Mr. Ed. Dodge took one *amatrix* and one *judith.* In two seasons there have been but two *amatrix* taken here. *Judith* is always rare. On August 12th, at night Mr. Dodge took one *nuptialis* at bait. I have never yet taken this moth.

The only *nebulosa* taken here last summer, I took on the 18th of August. The season before we took several specimens of this fine moth.

On the 5th of August Mr. Ralph Dodge was fortunate enough to take a fine *cara* with yellow instead of red on the hind wing, a peculiar freak in color.

On the 29th of August Mr. Ed. Dodge took *C. marmorata,* the first ever taken here, a magnificent specimen.

On the 11th of the same month, the writer took the first *viduata* he ever saw here and it was the first and only one taken here this year. From the 1st to the 15th of September many specimens of *vidua* and *robinsoni* were taken, the latter, almost invariably on the bodies of white oak trees.

Specimens of *insolabilis* and *flebilis* were taken in the summer of 1906 but not in 1907.

On the 29th of June, 1906, I took at bait one *consors* and Dodge took one *parta.* Neither have been taken since.

On the 19th of July, 1906, Ralph Rowley took a single specimen of *C. coccinata,* a species rarely taken anywhere.

All in all, the summer of 1907 was an interesting one en-

tomologically, hereabout, despite the unfavorable character of the early part of the season. The time of appearance of all lepidopters was later than the summer before by from a week and a half to three weeks, but when butterflies did put in an appearance they seemed to make up for lost time in numbers. *Papilio cresphontes* and *troilus* were more numerous than they had been for years, while *turnus* and *ajax* were common.

The great moths *Citheronia regalis* and *Eacles imperialis* had their day along with the rest and their horrid (?) larvæ were brought to the *bugman* in paper bags and glass jars for identification, with the query as to just how long a human being would live after being bitten by one of these venomous (?) creatures.

The year 1881 was a great insect year here as the writer now remembers it, and about the middle of June thousands of specimens of *Argynnis idalia* could be seen poised over wild flowers or on the wing in the prairie country west of Vandalia, Mo. Scarcely a dozen specimens of *idalia* have been seen by the writer since.

Notes on Necrophorus orbicollis Say.

By C. O. Houghton, Newark, Del.

While at work about some peach trees in my back yard late in the evening of May 30, 1906, my attention was attracted to what I at first thought was the stridulation, at close hand, of the plum curculio, *Conotrachelus nenuphar* Hbst. I was about to strike a match to look for curculios on the limbs of one of the peach trees, when I discovered that the noise I had heard was caused by several specimens of *Necrophorus orbicollis* Say, which had congregated about a dead mouse that lay on the ground beneath the tree.

Wishing to learn something of their movements about the mouse, and the cause of the stridulation, I secured a candle, some matches, a box for a seat, and proceeded to investigate. It was then about 8 o'clock and the moon was shining. The night was still and the temperature about 60° F.

Just as I was seating myself near the dead mouse a large beetle came flying about the spot, and on knocking it down

and securing it I found it to be another specimen of *Necrophorus orbicollis*. While securing this specimen I could plainly hear the others about the mouse and, in addition to the stridulating sounds, others were heard, as though the various individuals were engaged in combat, the mandibles of one grating on the chitinous parts of another; and this is what appeared to be taking place when I lighted my candle.

At that time there were five specimens about the mouse and four of these were fighting, in pairs, close to the carcass. Their purpose was, evidently, to keep each other from reaching the body of the mouse, and to do this they would seize each other with their legs, and apparently their mandibles also, and roll about in a most ludicrous manner, all the time keeping up their stridulating sounds. At intervals they would release their holds upon each other and return to the carcass, only to renew the combat a little later. They did not appear to mind the light much, especially if it was held at a distance of a couple of feet or so. However, one took flight after a short time, possibly owing to the light.

Desirous to know how the stridulating sounds were produced, I seized one of the beetles with a pair of forceps and held it up, and it was easy to see that the sound was produced by a movement of the abdomen, apparently causing the upper surface of one or more of the abdominal segments to rub against the elytra.*

I collected four of the beetles about the mouse—all that I could locate—at 8.20 P.M., and left the carcass for nearly an hour. At 9.10 I again visited the place with my candle, and was somewhat surprised at first to find the mouse gone from the spot where it had lain. I soon located it, however, at a distance of several inches from its former resting place, and found three more of the beetles, which I collected, about it.

My observations for the night closed at 9.50, when I again visited the mouse and secured a single beetle.

* Since making these notes, in 1906, the writer has noticed a single reference relative to stridulation in *Necrophorus*, viz., Third Report of the State Entomologist of Missouri, p. 14, where Dr. Riley, in speaking of the stridulating organs of various Coleoptera, says: "In the burying beetles (Necrophoridæ) these rasps are situated on the fifth abdominal joint, and are scraped by the posterior margin of the elytra."

Winged Aphids.

C. W. WOODWORTH, Southern California Pathological Laboratory, Whittier, Jan. 17th, 1908.

In the course of a study of the cabbage aphis, *Aphis brassicae,* it was noticed that the wilting of the plant resulted in an immediate slowing down of the birth rate. This season has thus far been unusually dry in the southern part of the State, and in almost all fields there have been innumerable cases of evident diminution in the number of aphids without much parasitism or sign of fungus or bacterial diseases. A leaf badly curled and almost entirely covered on one side by the aphids first shows a spontaneous production of young with wing pads. When these young have become full grown they fly away and the leaf becomes ultimately entirely free from the insects, except perhaps the bodies of a few swollen up parasitized individuals that may still remain and the cast skins that sometimes cling to the surface.

There may be some connection between these two observations, since the failure of plant lice to develop wings under more favorable conditions may be due simply to the rapidity of development of the rest of the body. After about one day from the birth of plant lice, those that are to produce wings are clearly distinguishable. Possibly the delay before birth resulting from a partial wilting of the plant, or possibly the shortage of food for the new-born insect may give the wing buds time to begin development and to reach a point where they have an even chance with the other organs of the body.

Professor Clarke has shown* that the common rose aphis, *Siphonophora rosae,* can be made to produce wings in the first generation upon rose cuttings in sand wetted with solutions of magnesium salts, while nothing else tried showed any effect. This is a case where there is no diminution in water supply; either the wing buds were stimulated by the presence of magnesium, or the other parts of the body were retarded. If the latter is true, it would simply fall in line with the suggestion made above.

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*The Journal of Technology. Vol. 1.

The grape *Phylloxera* (*Phylloxera vastatrix*) produces an abundance of winged individuals in Europe and elsewhere in the United States, but in California winged forms are extremely rare. This possibly corresponds with the high ratio that soda and potash bear to magnesium in our soils.

Mr. O. Butler, of this department, has suggested to me that since winged forms are produced on the finest roots near the surface of the ground, their absence in this State might be better explained by the almost invariable destruction of such roots in this dry climate.

The occasional production of broods of winged *Phylloxera* may be due to variations in the annual rise and fall of alkali, thus affecting the ratio of the different salts near the surface of the ground, thus conforming to the chemical theory of wing production, or the explanation may be that a better moisture condition on such years may permit sub-surface rootlets to live long enough to produce a brood of winged individuals. The reason for the development of winged forms on these upper rootlets may be according to the second explanation, the slow drying out of these parts or their periodical wilting during the summer resulting in a condition comparable with that occurring now in our cabbage fields.

Similar phenomena occur in this region in the case of numerous other species of plant lice. They increase until they reach a point where the leaf will be brought, by their combined attack, to a semi-wilted condition, and then all the young subsequently produced will develop wings. Whole trees are thus sometimes spontaneously freed from plant lice.

It is well known that wing-producing lice develop much more slowly than those that remain wingless. The present suggestion is that a slower development, either immediately before or after birth, is the exciting cause of wing formation.

The foregoing is presented with the hope that others will make observations, the coming season, of evidence of spontaneous wing production and its relation to dry periods or to excessive infestation of the plant.

Further Notes on Alberta Lepidoptera.

By F. H. Wolley Dod, Millarville, Alberta, Canada.

Argynnis monticola Behr.?

I have only a single Banff male that could possibly be associated with this name, and cannot find by what authority I so listed it, as I do not think the specimen has ever been sent away for a name. I much regret that Dr. Skinner records the species from Banff on my authority. Since publishing my list of butterfies in 1901 I have paid no attention to this specimen or its associates until now, though I had ample opportunity of procuring a long series of *rhodope* from British Columbia, where it is common, had I so desired. As it is I have only four males, one from Vancouver, two from the Island, and the fourth from Kaslo. The three coast specimens are much alike, agree with Dr. Holland's description and, allowing for sexual differences, with his figures. The color of secondaries beneath is very dark, the spots yellowish or slightly silvered only, except the marginal row which are distinctly silvered. The Kaslo specimen is slightly smaller, paler in ground color as well as in shading above, has paler secondaries beneath, with no trace of silver on any of the spots, and those on the margin are slightly larger than in the coast specimens. It agrees in these details with Holland's figure (underside) and description of *monticola* except in having more of a rusty red and less of a purplish shading on secondaries. Such slight material forms unstable ground for conjecture, especially as there are not names to fit both forms in the B. C. lists, but the Banff and Kaslo specimens are alike, and certainly suggest a distinct species from the *rhodope* so common in coast collections. Under *rhodope* in the Kootenai lists Dr. Dyar mentions that Mr. Cockle had the species standing as *monticola*.

A. halcyone Edw.

I thus listed the species on the authority of Dr. Skinner, who has specimens from me and enters the record in Supplement No. 1 to his Catalogue. I have now under examination, 12 ♂ and 3 ♀. The ♀ sex, which I had been unable to compare when writing my former notes, fits Mr. Edward's figure to a

nicety. Of outside material allied to the local form I have in my collection altogether two dozen specimens received from various localities and collectors under the several names of *halcyone, coronis, chitone, platina* and *snyderi.* Specimens under the last name resemble my No. 8 less than any of the rest. I do not vouch for the correctness of the names, and as localities are perhaps safer than names in speaking of some allied forms of *Argynnis* I will give them in making comparisons. A ♀ from "Oslar, Col." labeled *halcyone* is more lightly marked and shaded above, and has buff band beneath, narrower and darker than any Calgary specimen and marginal row of spots on secondaries smaller. *Coronis* from Glenwood Springs, Col., comes nearer, but like *halcyone* from Oslar differs in being more lightly marked and shaded above. *Chitone* from Yellowstone Park, Wyo., six to seven thousand feet, is very slightly paler above than my palest, but otherwise I can match it exactly. There remain nine specimens received as *platina.* These I have divided in two series, which if not species are at least well marked local races. The first series consists of two males from Beaver Canyon, Idaho, and Stockton, Utah, and a female from Soldier Canyon, Tooele Co., Utah. The first of these is one of the type localities of *platina,* comes from Dr. Barnes and agrees with the description. This series differs from the Calgary species in being slightly paler in all the details of color and shading, but more distinctly in having rather larger silver spots and a wider, buff band. The other series of four males and two females are from the mountains of Colorado above 8,000 feet bearing labels "Pinnacle," "Gore's Range" and "Williams River Range." They are darker and more heavily black-marked and shaded above, and having the spots smaller and buff band narrower than the other series, fit the Calgary species exactly except for size which is very slightly smaller in the males, with the females relatively smaller still.

LINDSAY SYMINGTON of Looe, Cornwall, England, wishes to correspond with a collector wanting British Lepidoptera, with the idea of exchanging British for American species. Specimens set or papered. Full data and names.

A Fossil Orthopterous Insect with the Media and Cubitus Fusing.

By T. D. A. Cockerell.

The first really fine insect found in the miocene shales of Florissant (Colorado) by the expedition of 1906 was a large beautifully spotted Orthopterous wing or tegmen. It was discovered by my wife at Station 9L, and was put aside for detailed study, which it has only recently received. The principal reason why it was not described sooner was its apparent resemblance to *Lythymnetes guttatus* Scudder, and the consequent possibility that it might belong to that species. In August, 1907, however, I went to Cambridge and examined the type of *Lythymnetes guttatus*, finding it to be entirely different from our insect. Later, part of a tegmen of *L. guttatus* was found in unpacking the collections of 1907; it was obtained by Mr. S. A. Rohwer at Station 14. The new form may take the name *Palaeorehnia*, in recognition of Mr. Rehn's important researches upon the Orthoptera.

Palaeorehnia maculata n. g, n. sp.

Tegmen. Exceedingly ample, the portion preserved 39 mm. long and about 17 across; the original length must have been over 55 mm. The venation may be compared with that of *Cyrtophillites rogeri* Opp., from the Jurassic of Bavaria. The subcosta is straight, a trifle arched about its middle, and gives off veins above (three can be seen), more oblique than those of *Cyrtophillites* (the costal region probably less ample); the radius is practically straight (not kinked in the middle as in *Cyrtophillites*), and the radial sector leaves it at the smallest angle possible, running alongside of it and diverging very slightly, but at length giving off a branch (the point of origin of this is not visible) which also leaves at a very slight angle; the media, so far as visible, is separate from the radius, but at about 8 mm. from the base it approaches it very closely and probably joins it a mm. or so further back; the media gives off two oblique branches below, the first or lower of which (M_2) unites with the anterior branch of the cubitus for a short distance, at the level of and not far from the origin of the other branch; the cubitus, 11 or 12 mm. from the base, breaks up into three branches, of which the first bends upward to join the media (M_2), and then leaving it, very soon branches and the upper ramus of the second branch forks again; the second and third branches of the cubitus are gently arched downwards, and appear to reach the margin without forking; the anal veins are three in number, the first two long and strong, not branched, convex above at base, and for the

rest of their course gently convex below. The veins, as in *Cyrtophillites*, are crossed by numerous transverse veinlets; these occasionally branch.

The maculation consists of light spots on a ferruginous-brown ground of various degrees of darkness; the spots cluster along the veins, and are conditioned largely by the transverse veinlets. This maculation is very different from that of *Lythymnetes*, in which the spots are mostly round and midway between the principal veins.

Hab.—Florissant; Miocene, Station 9 L (*W. P. Cockerell*, 1906).

The interpretation of the venation of *Palaeorehnia* was not at once evident; the union of the media with the cubitus and its later departure therefrom, is a confusing character, only readily understood by comparison with other types. Curiously this character is present in the ancient and extraordinary insect *Eugereon bockingi* Dohrn., from the Permian. The same character is found in the anterior wings of the Neuropterous *Sialis* and *Raphidia*. Among the fossil Orthoptera the union of the cubitus with the media is found in *Cyrtophyllites rogeri*, an insect with broad tegmina having many points of resemblance to *Palaeorehnia*, together with very important differences. In the ordinary Acridiidae the cubitus bends upwards toward the lower branch of the media and at the point of closest approach there is a cross-nervure. It is perhaps permissible to assume that this indicates descent from a form in which the nervures actually joined. Among the specimens and figures of recent Orthoptera available, I was not able to find any genus in which the media and cubitus fused in the manner of *Palaeorehnia*. Mr. Rehn has very kindly sought for this character among the far better materials at his command, and has found it essentially as in *Palaeorehnia* and *Cyrtophyllites*, in the Phaneropterid genus, *Tetrachoncha* Karsch., 1890. This genus is exclusively African, with four known species. In the Pseudophyllinae Mr. Rehn found tendencies to the same condition in a great number of diverse genera, but in no case true coalescence. In eighteen genera of Phanopterinae he found tendencies similar to those just described for Acridiidae; the character of the cross-vein varying, the approach being very decided in *Ischyra*,

and slightly less so in *Philophyllia*. The eighteen genera are as follows: *Elimaea* (Oriental region), *Aniara* (Neotropical), *Hyperophora* (Neotropical), *Ægimia* (Mexico and Central America), *Ancylecha* (Malay region), *Phyglea* (Malay region), *Sympaestria* (Malay region), *Terpnistria* (S. Africa), *Plagiopleura* (Neotropical), *Hyperphrona* (Neotropical), *Prosagoga* (Neotropical), *Pycnopalpa* Neotropical), *Syntechnia* (Neotropical), *Philophyllia* (Neotropical), *Ischyra* (Neotropical), *Posidippus* (Neotropical), *Weissenbornia* (Africa), *Pyrgophylax* (Oriental).

The wide distribution of this tendency, together with the facts already related, would seem to suggest the retention here and there of an originally common character, rather than the parallel development of something new. It seems just possible that Scudder's *Cymatomera maculata* may be *Palaeorehnia;* the reference to *Cymatomera* was wholly provisional. The species was founded on fragments of the base of a tegmen, and perhaps cannot be certainly recognized.

Two New Species of Eupithecia Curtis.

RICHARD F. PEARSALL.

Of the eastern *Eupithecia* it seems desirable that the types of closely allied species should be retained where they may be accessible for comparison and study in their home region. I venture therefore to offer descriptions of some which I think should be classed as new:

Eupithecia conformata n. sp.

Expanse 14-16 mm. Palpi long, not very stout, soiled white with a few dark gray scales above. Vertex and front grayish white or white with two spots of dark gray below antennæ, and a border line of same above clypeus. Antennæ dark gray annulate. Thorax, pale gray darker in front, whitish centrally and on posterior region. Abdomen above pale gray and brownish scales mixed, whitish at base, on second segment a lunule of brownish scales often absent, tufts not prominent, dark gray, anal segment paler. All wings above, clear pale gray, submarginally darker. Forewings narrow somewhat extended at apex, with three square costal blotches black, the beginning of cross lines, which consist

of black dots on the veins more or less distinct. Basal line much broken, beyond it a pale line divided centrally by a fine darker hair line. Median line, also broken, turns from costal blotch toward discal dot, then in waves straight across wing. Extra-discal makes a sharp angle at costa, then rounds out opposite cell, and with slight inward curve reaches inner margin two-thirds out. Beyond this a pale line, strongly angulate at costa, centrally divided by a pale gray hair line, runs parallel with it across wing, succeeded by a gray shade line, more or less distinct which sometimes ends in a dusky spot at anal angle. Submarginal white line much waved, not very clear, and lacks the prominent white double dots of *miserulata* at the anal angle. Hind wings with inner margin showing the inception of five cross lines, those at base darkest, only two of which cross the wing extra-discally enclosing the broad pale line, which is continued from forewings in a curve subparallel with margin. Fringes long, pale gray, darker basally at end of veins. Marginal line obscure, dark gray broadly cut at veins. Discal dot on forewings large, round, prominent black; on hindwings small, obscure. Beneath, a clear silken gray; the discal and extra-discal with its succeeding pale line across all wings. On hind wing, the median line makes a sharp outward angle at cell touching discal dot at its apex Basal line also evident, the entire series of lines composed of dots on veins. Marginal line heavier and discal dots distinct on all wings. Body beneath and legs whitish.

Type— ♂. Big Indian Valley, Catskill Mts., July 1, '06.

Type— ♀. Bronx Park, New York City, June 23, '04, in the collection of R. F. Pearsall.

The species is evidently double brooded, and resembles *miserulata,* but is smaller, the males being easily separable by their slender shortly ciliate antennae, the prominent round discal dots on fore wings, and absence of yellowish scales on thorax and head.

Twenty-four males and females, co-types, taken in Bronx Park, April 25 to May 4, and in Catskill Mountains, July 2 to August 1.

Eupithecia filmata n. sp.

Expanse 17-18 mm. Palpi long, rather stout, dark brown. Vertex and front smooth with yellow brown and white scales mixed. Antennæ pale yellow brown, annulate in the ♂ heavily biciliate. Thorax above dark brown, pale at centre. Abdomen above and beneath, with dark brown and whitish scales mixed, rough; the first segment pale, the second dark brown, tufts black. Forewings broad, somewhat extended at apex,

rounded, with inner margin straight. Hindwings broad, rounded, the margin rather straight between veins three and six, all of thin texture and clothed with yellow brown and pale scales, having lines and veins mottled with dark brown, much after the style of *lachrymosa* Hlst. of which it is a close ally. On forewings basal and discal spaces are somewhat darker, separated by a pale line starting from costa about one-fourth out in a sharp outward curve, thence straight across wing to inner margin. The extra-discal line a little heavier especially at costa than any other, and somewhat diffuse, starts three-fourths out, with a slight outward curve, not angled, around discal dot, thence in a series of small outward scallops crosses to inner margin within anal angle, succeeded by the usual broad pale line running parallel with it. Subterminal space darker, the hair line not clear except at anal angle, where it becomes white, ending in geminate dots, emphasized by a cluster of dark scales surrounding them. Marginal line dark brown, cut at veins. Fringes long, ground color of wing, a little darkened opposite veins. Discal dots linear, black. The discal space is sometimes centrally divided by a broad pale line. Starting one-half out on costa, which with a sharp outward trend passes *outside* the discal dot thence waved to inner margin. Hindwings with dark triangular basal area, between which and the extra-discal line, which is continued from forewings in a diffuse outwardly curved line to inner margin one half from base, is a broad clear space in which is placed the faint discal dot. The pale line following extra-discal is more or less evident, partially defined along outer border on both wings by short dashes of dark scales on veins. Subterminal space darkened with marginal line and fringes as in forewings. Beneath, pale yellowish ashen, glossy, with the pale cross lines above all reproduced, bordered by dusky dotted or diffuse lines, the extra-discal heaviest, with black patch at costa. Body and legs pale ashen.

Type.— ♂ and ♀, *taken in coitu,* Big Indian Valley, Catskill Mountains, June 29, 1907, and co-types from Bronx Park and Long Island, in collection of R. F. Pearsall. One ♀ from Bronx Park is darker, more heavily scaled, but the usual form is pale, with markings more indistinct than the types, especially if rubbed.

PROF. TREVOR KINCAID, of the University of Washington at Seattle, has been asked by Dr. Howard to go over to Japan and organize a system for the collection of the Japanese parasites of the Gipsy Moth similar to that which is now in operation over in Europe. He expects to have a good time and to do a pile of hard work in the land of the little brown men, and has started in to learn the lingo.

Chaitophorus Testudinatus in America.

By O. W. Oestlund, University, Minn.

In the December number of the News there appeared an interesting article on the dimorph of *Chaitophorus negundinis* Thos., as observed in Colorado by Mr. Bragg. The following notes and corrections may therefore be timely as attention has now been called to this peculiar form in America. I found the same quite abundant on the maples in Minneapolis in 1897, and have since observed it at various places in Minnesota.

Mr. Bragg, it appears, is unaware of Kessler's* paper on the same dimorph, the most complete on the subject. The dimorph was first discovered and described by Thornton† as *Phyllophorus testudinatus,* and by him considered to belong to some undescribed aphid. Balbiani and Signoret‡ later proved its connection with the *Chaitophorus* on the maple, since considered as *Chaitophorus aceris* (L.) Koch, 1854. They also came to the conclusion that the dimorph, after continuing in an unchanged condition for months, at last perishes and comes to nought. Kessler, in the above mentioned article, showed that three distinct species had been included under *Chaitophorus aceris* by authors, quite similar in general appearance but very distinct as to life-history.

A green variety Kessler assigns to the original *Chaitophorus aceris* (L.) Koch., 1854; a brown variety he ascribes to *Chaitophorus testudinatus* (Thorn.) Kessl., 1886; the third variety is described as new under the name *Chaitophorus lyropictus* Kessl., 1886. The first two have a summer generation that remain as larva in an unchanged condition for three months or more, after which they resume active life and pass through the customary moults. As adults they proved to be the sexupara producing the true sexes: the apterous females and winged males. The dimorph of the first differs from the second in wanting the flabellæ and in the body not being flattened.

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*Kessler, Nova Acta Leop.-Carol. Akad., Vol. 51, pp. 151-178. 1886.

†Thornton, Trans. Micr. Soc. London, Vol. 3. 1852.

‡Balbiani et Signoret, Comptes rendus Acad. Sci., Vol. 14.

The dimorph of the second species is apparently the same as that found by Mr. Bragg in Colorado and myself in Minnesota. Kessler's figure shows the 22 flabellæ on the abdomen, while Buckton is evidently at fault as to the number in his figure. As our American material appears to agree in all respects with the figures and descriptions of the European, I have for some time held the two to be the same and that it should be known as *Chaitophorus testudinatus* (Thorn.) Kessl., 1886. Kessler's third form has no dimorph, but continues to produce the spuriæ during the summer as usual in the family.

The question if *Chaitophorus negundinis* Thos., 1878, should be considered as a synonym, or if we also have two or more species under one name, may best be left an open question until the life history of our maple *Chaitophorus* is better known than at present.

The fact that the summer generations of the first two remain as larvæ unchanged for three months or more, Kessler considers as a summer sleep or hibernation; in which case it may be better to speak of it as a specialization and not as a degeneration.

An Aphid Feeding on Coccinellid Eggs.

By A. Arsène Girault.

During early June, 1907, I had in confinement a number of pairs of the ladybird *Megilla maculata* DeGeer, in the laboratory at New Richmond, Ohio. Each pair was confined in an ordinary glass tumbler covered with cheesecloth, and every morning a twig of plum, badly infested with an aphid especially common on that food-plant in that vicinity, was introduced to serve as food. These aphids were eaten voraciously by the beetles. The female beetles were occasionally depositing eggs in small batches of about from ten to fifteen, and quite often it was noticed that these eggs failed to hatch. At first this was thought to be due to infertility, although in several instances the egg masses were found to be thickly covered with aphids which had left their wilting or wilted food; besides the pairs of beetles were mating and some of the eggs deposited by them had hatched.

On the morning of June 10th several eggs in a freshly deposited mass were noticed to be shriveled and, as the aphids were then clustered about the others, it was decided to investigate. After careful examination under a lens and low-power microscope it was found that the aphids had inserted their beaks into the eggs and were actually sucking them dry. A winged female and as many as six nymphs were watched thus feeding, each insect completely absorbing the contents of a single egg during the observation. Each egg gradually collapsed.

I believe that this fact has not been recorded; the conditions under which it was observed, namely, those of confinement, must be taken into consideration. Has this anything to do with the fact that coccinellid eggs are seldom or never found in colonies of aphids?

Notes on Some Neuropteroids from Raleigh, N. C.

By C. S. Brimley.

I. Chauliodes.

On April 4, 1906, I found some *Chauliodes* larvae preparing to pupate under the bark of rotten and soggy stumps near a marsh. All had the respiratory tubes on the eighth segment, close together and unequal in length. I put them in a jar with some damp, rotten wood, and most of them pupated.

From the pupae emerged big, gray *Chauliodes*, of which one which emerged on April 21st and another on May 4th were *C. pectinicornis* by the antennae; the rest, of which one emerged on April 20th, five on April 21st, and two on April 22d, were all *C. rastricornis* judging by the antennae.

On April 22d, 1907, I found another lot of larvae in the same locality and in similar situations to the others. All had respiratory tubes close together and unequal, and appendages on the tenth segment extending beyond the claws of that segment. From these nine adults were bred, a *rastricornis* on May 15th and eight *pectinicornis*, one on May 15th, one on May 17th, four on May 19th, and two on May 20th. I have also taken two *pectinicornis* on sugar.

II. Neuronia semifasciata.

While sugaring for moths in my yard in 1905, I took, on July 8th, a caddis fly apparently attracted by the sugar; next year I took another also in July, and, like the previous specimen, belonging to this species. In 1907 I started sugaring earlier, and got ten of this species between May 5th and June 16th. I also took a specimen at Lake Ellis on sugar on May 5th.

Other Neuropteroids taken at sugar have been two *Chauliodes pectinicornis* in July, 1905 and 1906; two *Allochrysa virginica*, one each on September 21, 1905, and September 1, 1906, and two *Chrysopa lateralis* on August 25 and September 1, 1906.

North Carolina Records of Odonata for 1906 and 1907.

By C. S. Brimley.

Progomphus obscurus Ramb. Lake Ellis, one May 16, 1906. Southern Pines, one received from Manee without date.

Gomphus exilis Selys. Lake Ellis, common May 8-18, 1906, and May 22-28, 1907.

Gomphus sordidus Hagen. Havelock, May 9, 1901, and May 25, 1907.

Boyeria vinosa Say. Enfield, one taken by Woglum, July 5, 1906. Raleigh, one caught in State Museum after dusk by the night watchman.

Nasiaeschna pentacantha Ramb. One taken at Raleigh, July 10, 1907, flying over the very same pool where I caught my first in 1902.

Coryphaeschna ingens Ramb. Lake Ellis. I took a female in the act of ovipositing May 16, 1906. Another was taken May 28, 1907.

Aeshna constricta Say. Highlands, three males and two females taken by Herman and Woglum, September 6-9, 1906. Raleigh, not uncommon from mid-September to mid-November.

**Cordulegaster fasciatus* Rambur. Highlands, one male taken by Woglum, first week in September, 1906.

Tetragoneuria semiaquea Burm. Lake Ellis, common, May 7-18, 1906, and May 23-28, 1907.

Tetragoneuria complanata Ramb. Southern Pines, two, April 8, 1907; oue April 17, 1906, all taken by Manee.

Somatochlora filosa Hagen. Raleigh, September 6-12, 1906, both females. Southport, male and female, late October, 1906; taken by Sherman. Southern Pines, female taken by Manee, August 5, 1907.

Somatochlora tenebrosa Say. Highlands, a male and two females taken by Sherman and Woglum, September 6-9, 1906. Raleigh, a female bred from nymph June 25, 1907.

**Nannothemis bella* Uhler. Southern Pines, May 30, June 11, 22, 1906; June 22, 1907; a number taken by Manee.

Sympetrum vicinum Hagen. Raleigh, taken up to December 13 in 1906.

Libellula basalis Say. Hendersonville, one taken by Sherman in June, 1907.

Libellula flavida Ramb. Southern Pines, June 6, 1906, one taken by Woglum; May 30, 1906 and May 28, 1907, taken by Manee.

Libellula exusta deplanata Hagen. Lake Ellis, May 8-18, 1906; not uncommon. Southern Pines, April and May, 1906, and 1907 several taken by Manee.

**Diplacodes minusculum* Ramb. Lake Ellis, two taken May 24, 1907. Southern Pines, taken by Manee, June 21, 1907.

Calopteryx dimidiata Burm. Lake Ellis, May 17-18, 1906, common on canal near camp. May 23-28, 1907, a few. Southern Pines, June 11, 1906, two.

Lestes vigilax Hagen. Lake Ellis, May 15, 1906, two taken.

Argia fumipennis Burm. Lake Ellis. Abundant May 7-18, 1906 and May 23-28, 1907.

**Enallagma pollutum* Hagen. Lake Ellis, May 15, 1906, one.

" *laterale* Morse. Lake Ellis, three specimens, May 8-18, 1906.

" *divagans* Selys. Lake Ellis, common in May, 1906, and May, 1907.

" *signatum* Hagen. Lake Ellis, two taken May 7-18, 1906.

" *aspersum* Hagen. Lillington, one taken by Neethling, June 8, 1906.

TERIAS MEXICANA BDV. IN NORTHERN COLORADO.—I can add another record of this species from Northern Colorado. In a collection of Lepidoptera collected by Mr. E. H. Richardson last summer, I found three rather battered specimens of *mexicana*. They were labeled, "Easley's ranch, dry creek above Paul Lewis ranch, Chimney Gulch above Golden as far up as the willow spring." They were taken on July 15. Maynard (N. Am. Butterflies, p. 43) gives the following distribution: "Mexico, Texas, Arizona, Southern California and Texas, also rarely to Nebraska, Iowa, Illinois, Wisconsin, and Ontario (Point Pelee), appears to be extending its range north and east." I have received it commonly from San Antonio, Texas.—C. R. COOLIDGE.

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* The species marked with a * have not previously been recorded from the State. Most of the Southern Pines records are from specimens taken by Rev. A. H. Manee.

The Abnormal Appearance of External Wing-buds in Larvae of Holometabolous Insects.

By Wm. A. Riley, Ithaca, N. Y.

The literature of entomology abounds in reported instances of insectan malformations varying all the way from slight abnormalities in venation or in the segments of an antenna, to duplication of appendages, or to those striking monstrosities in which the head of the larva is preserved by the imago. When we consider the minute scrutiny of the systematists it is not surprising that the vast majority of these instances relate to adult insects. It is to another type of abnormality—the appearance of external wing-buds in the larval stage—that I wish to call attention.

It is a well known fact that the wings of insects with complete metamorphosis are developed as internal invaginations during the larval stage and normally become visible externally only at the time of pupation. So far as I know the recorded cases of abnormalities in which the wing-pads are external in the larva all relate to two species of Coleoptera.—*Tenebrio molitor* and *Anthrenus varius*.* To these may now be added a third, that of the Pyrochroid, *Dendroides canadensis* Latr.

In 1896, while experimenting with meal-worms (*Tenebrio molitor*), Heymons† found a full-grown larva which possessed a pair of peculiar appendages on the meso- and metathorax. These appendages were symmetrical, those on the mesothorax being somewhat larger than those on the metathorax. Closer

* I except the remarkable cases, reported by Cesare Majoli, 1813, of silk worm larvæ which, instead of forming cocoons after the fourth molt, developed wings and other structures of the adult. From the meager accounts available (Stannius '35, Hagen '72) it seems to me that we here have to do rather with abnormal adults which have preserved larval characteristics. To be sure, the line between the two types is rather arbitrary and it is greatly to be hoped that in the future any instances similar to those recorded by Majoli will be carefully and fully reported.

† Heymons, R. '96. Flügelbildung bei der Larve von *Tenebrio molitor*. SB. Ges. naturf., Berlin, 1896, pp. 142-144. Also in Ent. Rec. xi, pp. 67-68.

examination showed that they were not lateral or dorsal excresences but true wing-pads occupying positions exactly similar to those of the wing-cases of the *Tenebrio* pupa. Since this larva was observed Professor Heymons has been able to find a number of larvæ of the same species presenting the same anomaly, and at the recent Zoological Congress at Boston he exhibited several such specimens.

Soon after the appearance of Heymon's first note, Mr. Busck exhibited before the Entomological Society of Washington,‡ six larvæ of the Dermestid, *Anthrenus varius,* each of which showed well marked wing-pads on the second and third thoracic segments.

In the summer of 1902 one of our students, Mr. P. B. Powell, who was breeding large numbers of Coleopterous larvæ, discovered the phenomenon in the case of one of a number of larvæ of a common Pyrochroid, *Dendroides canadensis.* This specimen showed the hinder pair of pads the larger while the contrary was true of the cases reported by Heymons. The larva was apparently in the last stage, and exhibited various other abnormalities which will be referred to later.

At first sight it seems strange that all of the individuals presenting this peculiarity are coleopterous larvæ but this is readily explicable when we consider the anatomical relations of the developing wings in this group. The best known type of wing development among holometabolous insects is what Tower has designed the "enclosed type" (the *Pieris* type of Gonin). In this the wing-bud invaginates and finally comes to lie in a closed sac connected with the body wall by a short, slender peduncle. Thus it lies wholly within the body cavity. On the other hand, the researches of Tower, '03, Powell, '04, and others, have shown that in Coleoptera the dominant type of wing development is that which Tower has designated the "simple type." Here as in the heterometabolous forms the wing rudiment is 'not sharply marked off from the body hypo-

‡Busck, Aug. '97. Larvæ of *Anthrenus varius,* showing wing pads. Proc. Ent. Soc. Wash. iv, p. 123.

dermis and is usually directly evaginated to form the imaginal organ.' Thus it is a comparatively easy step to the abnormality of a free, external wing-pad, whereas such a condition would be much more abnormal with the enclosed type of the Neuroptera and Lepidoptera or the still more highly specialized stalked type characteristic of the higher Diptera.

Intermediate between the simple and the enclosed types is the "recessed type" of Tower (the *Corethra* type of Gonin). As defined by the former, here "the fundament is invaginated and then evaginated, and so lies in a hollow niche in the hypodermal wall, but opens broadly against the cuticula." This type he found in the Scarabæidæ among the Coleoptera while Weismann, '66, had reported it for *Corethra, Simulium*, and other nematocerous Diptera. Thus it is possible that specimens of these forms may be found in which the buds are free on the surface, though no such instances have been reported.

As to the significance of the monstrosities under consideration there have been advanced two views.

According to the one interpretation the occurrence of the external wing-pads in the larva is to be regarded as an instance of atavism—a harking-back to a period when the larva bore wings.

The second interpretation, that favored by Heymons, is that in these cases we have illustration of anticipatory monstrosities.‡ a kind of premature development in which characters normally present in the pupal state are present abnormally in the larva. He supports this view by citing other abnormalities present in his specimens.

That the latter interpretation is the correct one is strongly supported by Mr. Powell's specimen. The most striking evidence is afforded by the fact that in addition to the usual lar-

‡ This instance and several very striking cases of anticipatory monstrosities in lepidopterous larvæ (prematurely developed imaginal antennae, maxillae, and legs) have been very fully discussed by H. J. Kolbe (Allg. Z. f. Ent., 1903, pp. 1-9, 25-30), who proposes for the phenomenon the term "prothetaly," τελος completion, προθεω to run before.

val ocelli the compound eyes of the adult are partially developed. Moreover, as in some of the *Tenebrio* larvæ there are present more antennal segments than in the normal larvæ, an approach to the condition of the adult. Certain other abnormalities whose significance is not clear, were noted by Mr. Powell. I am under obligations to him for permission to use the data relative to his specimen, but it is to be hoped that he may return to his studies and present a fuller account of this interesting abnormality.

Two Workshop Notes.—In examining dried specimens of insects and in "posing" them for photographing it is often desirable to change the position of a wing, leg or antenna without disturbing other parts and without waiting to soften the whole specimen in a moist chamber. This may be done with larger insects by the use of a small camel's hair brush and boiling water. The brush, placed in the water, takes up a small drop which may be applied directly to the joint or part to be softened. A few rapid passes of the brush from the water to the part are sufficient, but it is desirable to have the specimen but a few inches from the water to prevent the drop from cooling. A small dish of water on a tripod heated by an alcohol lamp is convenient for this purpose. Parts moved in this way become fixed again as soon as dry.

The compound microscope with low powers is often used in place of the hand lense in examining pinned specimens. While in rapid work it is more convenient to simply hold the pin in the fingers, steadying the hand on the stage of the microscope, it is frequently the case that a longer or more careful examination is desirable. For holding specimens under the compound microscope the writer uses an ordinary tapering cork stopper fastened to a microscopical slide at about one-fourth the distance from one end. Canada balsam may be used for fastening the cork to the glass. Heat a drop of balsam on the slide long enough to make it brittle when cold, and while still warm press the large end of the cork into the balsam and allow to cool. Where a mechanical device for moving slides on the stage, such as is made by the Spencer Lens Co. or the Bausch & Lomb Optical Co., is in use, the slide may be placed in the clamps of the attachment and the specimen, pinned to the side of the cork, may be moved with precision.—R. A. Cooley, Bozeman, Montana.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., MARCH, 1908.

At the present time it is possible to have made excellent illustrations of insects by the half-tone process or by line engraving, provided the copy or drawings are good and properly prepared. For many purposes a line cut is just as good as a half-tone and costs very much less. We frequently have sent to us copy for plates that is troublesome or not suitable, because some authors do not know anything about the methods of reproduction of plate copy. Copy for line engraving should consist *of lines and dots only* and the ink used should be the *blackest* the artist can procure. If a number of small drawings are made for line engraving, make them so that they can be assembled into a single plate, or draw them all on one card. If blocked separately, it adds enormously to the cost. The half-tone is used for wash drawings and the reproduction of photographs. Always remember that everything shows in a half-tone and that the outlines of many figures are such that the plate cannot be tooled, or routed, or outlined. We get copy consisting of line and dot work and wash drawing and photographs mixed and this necessitates making a half-tone, whereas, if kept separate, both processes could be used separately at less expense. If you make small sketches on separate cards, bear in mind that if assembled, the reduction must be the same for all of them, therefore make them with this in view. It is always a good plan to have the drawings or photographs larger than the size of the resulting plate.

We give some examples of the different processes and kinds of plates:

Plate V, Feb. '08, is a half-tone.

Plate I, Jan. '08, is a mixed plate, Fig. B, being a half-tone, had to be inserted; the other figures are line engravings.

Plate II and III, Jan. '08, are line engravings.

Plate XIII, Oct. '07, is a routed or outlined half-tone.

Plates XV and XVI, Dec. '07, are line engravings.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

PROF. JOHN B. SMITH is getting some very interesting points for his paper on Homoptera. The older species have been badly mixed in collections. Anyone having material should send it to him.

Digby, February 5, 1908.

IN ENTOMOLOGICAL NEWS you sometimes refer to hanging cocoons of *polyphemus*. I have found about thirty of these this winter, a few on low blueberry, and the rest on birch. When on the birch the cocoon was always at the very tip of the twig, and was enwrapped by the three or four end leaves. The silk was spun up the stems of the leaves and then around the twig, but so little was used that a slight pull or a sharp shake would bring the cocoon off. When on blueberry it was surrounded by leaves and generally attached to two or three of the upright twigs. In no cases were the cocoons more than a foot from the ground.—JOHN RUSSELL, Digby, N. S.

AN INTERESTING letter has been received from the Rev. Henry C. McCook, D. D., dated Brookcamp, Devon, Pa.

"I have been ill in bed for five weeks and am just beginning to get about. I did not see until now the honor which had been conferred upon me by the newly formed society of American entomologists in electing me an Honorary Fellow. I appreciate the honor and now beg through you to return cordial thanks for the same. At my advanced age and in my state of health no serious original work is possible. The future, which is most promising, is with younger entomologists, and they seem to be measuring well up to their opportunities. Yet

I continue to do something in the way of interpreting the natural history of our "little brothers" to the thinking people. I am now putting the finishing touches upon another book—'Ant Communes, and How They are Governed.'"

Doings of Societies.

At the regular monthly meeting of the Brooklyn Entomological Society, held on December 5th, 1907, the President, Dr. Zabriskie presided and fifteen members were present.

Prof. Smith spoke upon the habits and peculiarities of the larvæ of *Culex perturbans*.

Mr. Franck exhibited an exceptionally fine melanic form of *Colias philodice* captured at Bethlehem, Pa., in August 1907.

Mr. Davis exhibited a specimen of *Basilarchia* intermediate between *arthemis* and *proserpina*.

Mr. Pearsall, who exhibited a series of *Basilarchia proserpina* as well as a number of other lepidopterous insects from the Catskill mountains, remarked that in his opinion *proserpina* is a good species. He thinks the larva feeds on apple. Mr. Franck has found the larva of *arthemis* in the Catskills feeding on wild cherry (*Prunus pennsylvanicus*) and Mr. Engelhardt secured a specimen in the same region, newly hatched from a chrysalid suspended from a willow branch.

A series of *Pieris napi*, both spring and summer forms, shown by Mr. Pearsall, was obtained from chrysalides from larvæ found feeding on crinkle root (*Dentaria diphylla*).

GEO. P. ENGELHARDT,
Recording Secretary.

JOSEPH THOMAS.

Died at Quakertown, Pa., Tuesday, January 28, Dr. Joseph Thomas, in his 89th year.

Dr. Thomas was one of the leading citizens of his town and a subscriber to the NEWS for many years. He took a great interest in Entomology and in natural history in general.

EXCHANGES.

Not Exceeding Three Lines Free to Subscribers.

☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Lepidoptera for exchange. Would like Californian species not in my collection.—Erval J. Newcomer, Palo Alto, Cal.

Wanted for cash or exchange.—Large and showy North American insects of *all orders*, beneficial and noxious insects, specimens illustrating life histories.—Write to Dept. Natural Science, The Kny-Scheerer Co., 225-233 Fourth Ave., New York.

Wanted for cash or exchange.—Bull. U. S. Div. of Ento. (old series), Nos. 1, 5, 10, 26, 33. J. A. Lintner's New York Reports, Nos. 3 and 13, Illinois Reports, Nos. 14 and 20, Missouri Reports, Nos. 7 and 9.—E. F. Hitchings, Waterville, Maine.

Luna Cocoons.—I have a number of living *luna* pupae of other North American Lepidoptera or papered Lepidoptera new to my collection.—B. R. Bales, M.D., Circleville, Ohio.

I have pupae of *Lapara coniferarum* and *Cith. regalis* to exchange for *Theclas*, *Lycaena* and *Chrysophanus* not in my collection.—H. H. Brehme, 74 13th Ave., Newark, N. J.

I have pupae of *Papilio turnus* and *cresphontes*, *Sphinx luscitiosa*, *chersis*, *Ampellophaga myron*, *Triptogon modesta*, *Paonias myops*, *Smerinthus germinatus*, *Ceratomia undulosa* and *P. guinquenmaculata*. Want other pupae in exchange.—John Kytlica, 1347 So. Scoville Ave., Oak Park, Illinois.

Geometridae wanted, named or unnamed, particularly from the Northwest, Arizona, Montana, Idaho, North Carolina, Texas and Florida. Write first giving quantity and price. Will buy or exchange. Wm. H. Broadwell, 209 Plane St., Newark, N. J.

Would like to exchange 80 named species, many specimens of European Coleoptera (many nice sp. Carabus, Calosoma, etc.), for 50 named sp. of Coleoptera from western states.—C. Harnach, 527 W. 16th Street, Chicago, Ill.

A few pairs of that interesting beetle *Ignotus aenigmaticus* Slosson for any of the following Cremastochilus 5913, 5915, 5916, 5917, 5918, 5919, 5921, 2924, 5928.—L. H. Joutel, 164 E. 117th St., New York,, N. Y.

Cocoons of *T. Polyphemus* and *Samia promethea* to exchange for *Samia cynthia Attacus crizaba* or others.—J. J. Henneberger, 10114 Ewing Ave., Cnicago, Ill.

Wanted. North American Diurnals, Spingidæ and Catocalæ. Offer in exchange large variety of European Lepidoptera.—J. McDunnough, Berlin, W. 30, Motzsh 6, Germany.

Wanted. Named or unnamed Elateridae and Buprestidae from all parts of North America. Will give named Coleoptera in exchange.—C. O. Houghton, Delaware College, Newark, Delaware.

I wish to exchange Chrysalids of *E. imperialis*, *P. ajax. troilus*, *turnus*, *D. hylaeus* and many others for exotic material.—G. H. Hosenfelt, 3656 Salena St., St. Louis, Mo.

Pupae of *Papilio ajax and troilus* for exchange, also a few specimens of *Anthocharis Pima and Stella*, from Arizona, Imagos.—N. Weil, Calhoun, Ky.

Lepidoptera for exchange from 1907 with data and identified. Also chrysalids of *P. turnus*, *cresphontes* and *troilus*.—F. Malkmus, 4398½ Tibson St., St. Louis, Mo.

Will collect in any order and supply European material in exchange for Lepidoptera, especially cocoons and pupae.—J. W. H. Harrison, 181 Abingdon Rd., Middlesboro, England.

Luna Cocoons.—I have a number of living Luna pupae to exchange for other living pupae or papered Lepidoptera new to my collection.—B. R. Bales, M. D., Circleville, Ohio.

Will exchange living pupae of *E. imperialls, P. ajax troilus turnus, D. hylaeus* and many others for exotic material.—Geo. H. Hosenfelt, 3656 Salena St., St. Louis, Mo.

Wanted, the coming season for cash or exchange, a large number of living pupae, strong and healthy, of all Diurnal Lepidoptera and Noctua (*Papilios, Actias, Attacus*), etc. Kindly communicate with J. Sever, 335 E. 49th Street, New York City.

I desire to buy original collections of beetles from North, South or Central America.—Fred. C. Bowditch, 164 Rawson Road, Norfolk Co., Brookline, Mass.

Wanted.—A large number of all species of *Plusiotis, Prionus californicus, Derobrachus geminatus, S. cessus, julianus, Dynastes granti, Tetracha carolina, Pasimachus mexicanus*, all species of Cincidelidae and all other big beetles (Coleoptera) for cash or exchange. Kindly communicate with J. Sever, 335 E. 49th Street, New York City.

The undersigned, with a view of making as complete a State list as possible, desires to communicate with anyone who has collected Michigan butterflies or made notes upon the same. All such are asked to write.—Dr. W. W. Newcomb, 347 Trumbull Ave., Detroit, Mich.

Coleoptera for Exchange.—Canadian Coleoptera in papers, in every family, for North American ones. List sent on demand. Also a large number of exotic Coleoptera.—J. A. Jean, C. S. V., Ville St-Louis, Montreal, Canada.

Indian Insects in all orders. Specimens of *P. mayo, Kal. albofasciata, Hestia cadelli*, etc., from Andaman Islands, and *T. imperialis, A. camadeva, Phylliums, Phasmids* and live cocoons from Darjeeling and Assam.—A. Meik, 4 Convent Road, Entally, Culcutta.

Lepidoptera.—I would like to correspond with those who expect to collect for cash in new and little known regions, South and West, during the coming season.—John L. Healy, 312 City Hall, Chicago, Ill.

Coleoptera.—Nine double boxes containing named beetles to exchange for perfect Japanese gold fish.—Aug. Schmidt, 845 E. Russell Street, Philadelphia, Pa.

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